AMENDMENTS TO THE DRAWINGS:

The attached drawing sheet includes changes to correct a typographical error in Fig. 3. Reference character 36 has been replaced by reference character 36', which is set forth in the specification, e.g., ¶ 28, l. 2.

Attachment: Replacement Sheet including Fig. 3.

REMARKS

By this Amendment, Applicant proposes amending claims 1, 6, 7, 10, 15, 16, and 20 and Fig. 3. Accordingly, upon entry of this Amendment, claims 1-20 will be pending in this application. No new matter will be introduced by this Amendment.

In the outstanding Office Action, claims 1, 4-6, 8, 10, 14, 15, and 17 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,147,635 to Fisher ("Fisher"); claims 1-6, 8, 10-15, 17, 19, and 20 were rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent Publication No. 56-39343 to Furusawa ("Furusawa"), an English translation of which is provided for the Examiner's consideration; claims 2, 3, 9, 11-13, and 18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Fisher in view of U.S. Patent No. 3,115,204 to Dence ("Dence"); claims 9 and 18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Furusawa in view of Dence; and claims 7 and 16 were indicated as containing allowable subject matter.

Applicant proposes amending claims 1, 10, and 20 to recite "the compound gear assembly comprising a first planetary gear train, a second planetary gear train and a third planetary gear train" and "each of the first, second and third planetary gear trains including a sun gear, a ring gear and a planetary carrier." Support for these amendments can be found at least in claims 6, 7, 15, and 16 as originally filed and ¶¶ 19-21 of the specification.

Applicant proposes further amending claim 1 to clarify the claim language by replacing "coactively" with "collectively" and to recite that "the ring gears of the second and third planetary gear trains and the planetary carrier of the first planetary gear train

are connected to the output." Support for this amendment can be found at least in claim 7 as originally filed and ¶ 22, ll. 4-8, of the specification.

Applicant proposes further amending claim 10 to recite "said at least three planetary gear trains being adapted to collectively drivingly engage said output directly" and that "the input drivingly engaging the sun gear of the first planetary gear train; wherein the ring gear of the first planetary gear train is connected with the sun gear of the second planetary gear train." Support for this amendment can be found at least in claim 16 as originally filed and ¶ 19, ll. 1-3, ¶ 20, ll. 1-3, and ¶ 22, ll. 4-8, of the specification.

Applicant proposes further amending claim 20 to recite that "the input being drivingly engaged by the sun gear of the first planetary gear train; and the planetary carrier of the first planetary gear train being connected to the output." Support for this amendment can be found at least in claim 16 as originally filed and ¶ 19, ll. 1-3 and 7-9, of the specification.

Regarding the prior art rejection of independent claim 1, neither Fisher nor Dence disclose or suggest that "the ring gears of the second and third planetary gear trains and the planetary carrier of the first planetary gear train are connected to the output," as recited in the claim. Fisher discloses a transmission having a forward drive gear unit 22 and a reverse drive gear unit 24, as shown in Fig. 1. The forward drive gear unit 22 includes a carrier 26 connected to two planet pinions 28, 30 and a load shaft 12 (Fisher, col. 2, ll. 11-16). One planet pinion 28 intermeshes with an input ring gear 32 and an input sun gear 34, and the other planet pinion 30 intermeshes with a reaction ring gear 36 and a reaction sun gear 38 (Fisher, col. 2, ll. 12-19). The reverse drive gear unit 24

includes an output planet carrier 48 connected to a planet pinion 50 that intermeshes with a reaction ring gear 52 and a sun gear 54 (Fisher, col. 2, ll. 40-47). Fisher's carrier 26 of the forward drive gear unit 22 is connected to the load shaft 12, but Fisher does not disclose or suggest connecting the ring gears to the load shaft 12. Therefore, Fisher does not disclose or suggest that a carrier of one drive gear unit and the ring gears of two other drive gear units are connected to the load shaft, as set forth in claim 1.

Dence discloses a power wheel assembly including "three planetary gear sets connected in series" (Dence, col. 1, l. 26). The first gear set 44 includes a sun gear 60, a planet carrier 62 connected to planet pinions 64, and a ring gear 55; the second gear set 46 includes a ring gear 81, a sun gear 84, and planet pinions 86; and the third gear set 48 includes a ring gear 83, a sun gear 90, and planet pinions 94 (Dence, col. 2, ll. 37-43, and col. 3, ll. 17-39). The planet pinions 94 of the third gear set 48 are connected to a wheel hub 16 to transmit power from the transmission and gear mechanism to the wheel hub 16 (Dence, col. 1, ll. 30-38, and col. 3, ll. 32-42). However, only the planet pinions 94 of the third planetary gear set 48 connect to the wheel hub 16. Therefore, Dence does not disclose or suggest that a carrier of one planetary gear set and the ring gears of two other planetary gear sets are connected to the wheel hub, as set forth in claim 1.

Furusawa also does not disclose or suggest that "the ring gears of the second and third planetary gear trains and the planetary carrier of the first planetary gear train are connected to the output," as recited in independent claim 1. Furusawa discloses a drive mechanism including a first gear set in which an input 3 is connected to a sun gear

4 that meshes with a planetary gear 5. The planetary gear 5 of the first gear set is axially supported by a carrier 8 and meshes with a ring gear 6. In a second gear set, a planetary gear 9 engages with the carrier 8 and the ring gear 6, and is axially supported by a carrier 10. In a third gear set, a planetary gear 13 engages with the carrier 10 and a ring gear 22 provided on an inner wall of a large-diameter rotatable case 11, and is axially supported by carriers 20, 21. However, the carrier 8 of the first gear set acts as a sun gear of the second gear set, the carrier 10 of the second gear set acts as a sun gear of the third gear set, and the carriers 20, 21 of the third gear set are connected to a stationary tube 17 (Furusawa, Fig. 2). None of the carriers are connected to the rotatable case 11. Therefore, Furusawa does not disclose or suggest that a carrier is connected to the output, as set forth in claim 1.

Claims 2-6, 8, 9, and 19 are allowable at least due to their dependency from independent claim 1. In addition, each of claims 2-6, 8, 9, and 19 recites unique combinations that are neither taught nor suggested by the cited art, and therefore each is also separately patentable.

Regarding the prior art rejection of independent claim 10, Fisher does not disclose or suggest "said at least three planetary gear trains being adapted to collectively drivingly engage said output directly... the input drivingly engaging the sun gear of the first planetary gear train; wherein the ring gear of the first planetary gear train is connected with the sun gear of the second planetary gear train," as recited in the claim. As discussed in the Reply to Office Action dated January 9, 2006, Fisher teaches that, in forward drive, only the two sets of gears in the forward drive gear unit 22 are capable of collectively rotating the load shaft 12, and in reverse drive, only the

reverse drive gear unit 24 and one of the sets of gears in the forward drive gear unit 22 are capable of collectively rotating the load shaft 12. Therefore, Fisher does not disclose or suggest three sets of gears that are adapted to collectively drivingly engage said output directly, as set forth in claim 10.

Dence fails to cure this deficiency. Dence's three planetary gear sets 44, 46, 38 are connected in series, and only the third planetary gear set 48 is connected to the wheel hub 16. Dence's first and second planetary gear sets 44, 46 are not connected to the wheel hub 16. Only the third planetary gear set 48 directly engages the output. Therefore, Dence does not disclose or suggest at least three planetary gear sets that are adapted to collectively drivingly engage the output directly, as set forth in claim 10.

Furusawa also does not disclose or suggest "said at least three planetary gear trains being adapted to collectively drivingly engage said output directly... the input drivingly engaging the sun gear of the first planetary gear train; wherein the ring gear of the first planetary gear train is connected with the sun gear of the second planetary gear train," as recited in independent claim 10. Furusawa's input 3 engages the sun gear 4 of the first gear set, but the ring gear 6 of the first gear set is not connected to a sun gear of the second gear set. Instead, the ring gear 6 is connected to an inner wall of a small-diameter case 7 that is attached to the large-diameter case 11. Therefore, Furusawa fails to disclose or suggest that the input is drivingly engaged with a sun gear of the first gear set and that a ring gear of the first gear set is connected with a sun gear of the second gear set, as set forth in claim 10.

Claims 11-15, 17, and 18 are allowable at least due to their dependency from independent claim 10. In addition, each of claims 11-15, 17, and 18 recites unique

combinations that are neither taught nor suggested by the cited art, and therefore each is also separately patentable.

Regarding the prior art rejection of independent claim 20, Furusawa does not disclose or suggest that "the input being drivingly engaged by the sun gear of the first planetary gear train; and the planetary carrier of the first planetary gear train being connected to the output," as recited in the claim. As discussed above in connection with independent claim 1, none of Furusawa's carriers are connected to the rotatable case. Therefore, Furusawa does not disclose or suggest that a carrier of one of the gear sets is connected to the output, as recited in the claim.

Fisher and Dence fail to cure this deficiency. As discussed above in connection with independent claim 10, Fisher discloses that up to two sets of gears may engage the load shaft 12. However, Fisher does not disclose or suggest that torque generated by the input is distributed to the output by each of the at least three planetary gear trains, as set forth in claim 20. Dence discloses that only the planet pinions 94 of the third planetary gear set 48 connect to the wheel hub 16, and therefore, does not disclose or suggest that a carrier of one planetary gear set is connected to the wheel hub, as set forth in claim 20.

Applicant respectfully requests that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing claims 1-20 in condition for allowance.

Finally, Applicant submits that the entry of the amendment would place the application in better form for appeal, should the Examiner dispute the patentability of the pending claims.

In view of the foregoing amendments and remarks, Applicant submits that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicant therefore requests the entry of this Amendment, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account no. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: June 29, 2006

By: _____
Denise L. Poy
Reg. No. 53,480

Attachments: Replacement Sheet including Fig. 3.
English translation of Japanese Patent Publication No. 56-39343.

Translated from the Japanese
June 23, 2006

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(54) Planet-gear type driving mechanism enabling oscillation of the shaft of a rotary body.

(21) Patent Application 54-114407
(22) Filing Date: September 6, 1979

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Specification

1. Title of the Invention.

Planet gear type driving mechanism enabling oscillation of the shaft of a rotary body.

2. Scope of the Planet Claims.

Planet gear type driving mechanism enabling oscillation of the shaft of a rotary body characterized as being internally housed so as to follow along with the rotating drum; the input axis and the motor driving axis are joined by a crown coupling gear; the output part of the device is such that the drum and the weight of the driving device are supported by a spherical roller bearing relative to the stationary support body; and

the output torque reaction force is taken in by the stationary support body by way of the crowning gear coupling; moreover, the aforementioned spherical roller bearing and two crown gear couplers are arranged in a straight line relative to the input axis.

3. A Detailed Explanation of the Invention.

The present invention relates to a satellite-gear type driving device that is hardly affected by the rotating driving force even if axis oscillation occurs. It is especially suited to the drum driving device of concrete mixers.

Now, figures will be used for explanatory purposes. In the concrete mixer vehicle of Figure 1 , (1) is an open-keg type drum. End A is supported by a spherical roller bearing. End B is supported by two rollers (18). As vibrations are absorbed while the mixer moves, there is concern the rotating axis will shake and drum rotation will stagnate or somehow stop. It is desirable to use the satellite gear drive device of the present invention to prevent this. Figure 2 shows an embodiment of this device. In the Figure, (2) is the driving axis of the motor. (3) is the input axis of the device of the present invention. Both axes are joined by a crowning gear coupling. This coupling consists of one side that has a swollen middle part while the other side is a gear having a straight line of teeth. In this invention, mounting on the tip occurs so as to penetrate into the drum through the base of the large-diameter case (11) outfitted with small-diameter case (7) and the small narrow tip. Furthermore, tube part (17) is inserted into the center of large-diameter case (11). Provided between this and the large-diameter case (11) is spherical roller bearing (15) by which the drum (1) and the whole weight of the device of this invention are supported. Both ends of the input axis (3) are axially-supported by gear coupling (16) and the small-diameter case (7) to rotate freely. Solar gear (4) is provided near the end part and meshes with the first stage satellite gear (5). Satellite gear (5) is axially supported by carrier (8) to rotate freely and engages with the inner gear (6) provided in the inner wall of small-diameter case (7).

Teeth (19) provided in the axis pipe of carrier (8) engage the second stage satellite gear (9). Said same gear also engages the inner gear (6) of small-diameter case (7) and is axially supported by carrier (10) to rotate freely. The teeth (14) of carrier (10) mesh with a third-stage satellite gear (13) axially supported between a set of carriers (20), (21) to rotate freely. Said gear also meshes with inner gear (22) provided in the inner wall of large-diameter case (11). The gap between the tip of carrier (20) and stationary tube (17) is joined by crowning gear coupling (25). Since this pipe part (17) receives the output torque reaction force of the present invention, the large-diameter case (11) rotates along with drum (1).

The most important aspect of the present invention is that the spherical roller bearing (15) and the crowning gear couplings (16), (25) are arranged in a perpendicular line relative to the input axis (3). Thereby, even with a concrete mixer whose other end is supported by two rollers, minute oscillations of the drum rotation axis centering on the spherical roller bearing are permissible, and smooth operations can be achieved.

4. A Brief Explanation of the Figures

Figure 1 a concrete mixer truck. Figure 2 is a partial cross-section of circle C in Figure 1.

(1) ... drum, (2) ... driving axis, (3) ... input axis, (4) ... solar gear, (5)... first stage satellite gear, (6) ... inner gear, (7) ... small-diameter case, (8) ... carrier, (9) ... second stage satellite gear, (10) ... carrier, (11) ... large-diameter case, (12) ... roller, (13) ... third-stage satellite gear, (14) ... teeth, (15) ... roller bearing, (16) ... crowning gear coupling, (17) ... tube part, (18) ... roller, (19) ... teeth, (20), 21) ... carrier, (22) ... inside gear, (25) ... crowning gear coupling.

Patent Applicant

Seiyo Seimitsu Sozo Manufacturing K.K.

Representative: Askisaku Tsuboi

Figure 1

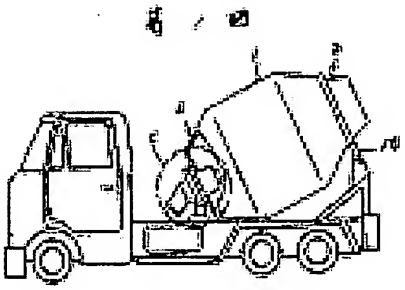

Figure 2